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PCT/GB 2005/000428


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Cardiff Road
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1. Your reference — 11410P1 GB/ED

2. Patent application number *(The Patent Office will fill this part in)* — 0404326.1

27 FEB 2004

3. Full name, address and postcode of the or of each applicant *(underline all surnames)*

Reckitt Benckiser (UK) Limited
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UNITED KINGDOM

Patents ADP number *(if you know it)* 07972136002

If the applicant is a corporate body, give the country/state of its incorporation — England

4. Title of the invention — Method and Apparatus

5. Name of your agent *(if you have one)*

"Address for service" in the United Kingdom to which all correspondence should be sent *(including the postcode)*

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Patents ADP number *(if you know it)* 07517675002

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11. I/We request the grant of a patent on the basis of this application.

Signature(s) John Crawford McKnight Date 27 February 2004

12. Name, daytime telephone number and e-mail address, if any, of person to contact in the United Kingdom

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# METHOD AND APPARATUS

The present invention relates to a method for the treatment of a surface, particularly a textile surface, and more particularly to a method for the treatment of a surface such that a stain is removed, or at least partially removed. The present invention also relates to products for use in such methods.

It is well-known to treat textiles such as clothing, carpets, mats, upholstery, fabrics, wall-coverings, and the like in various ways. For instance, it is possible to treat textiles to impart a fragrance thereto, to condition them (for example, by the use of anti-static agents, and the like), or to cleanse them (by the use of powder or liquid detergent compositions, and the like).

Conventionally, in order to perform the task of washing textiles, that is, in order to remove common stains and the like, some water and a washing machine is required to complete the washing task. Moreover, the task can take several hours to complete, including the drying process. In addition, this conventional process will wash the whole garment or article, and in the case of a spot stain, this is clearly not necessarily required. In effect, the conventional washing/drying process is both time-consuming and wasteful of resources if all that is required is treatment of a spot stain. Conventional dry cleaning processes have similar drawbacks.

A further disadvantage in using conventional washing processes when treating spot stains is that it is not always possible or convenient to treat the spot stain

immediately, for instance if the required conventional washing equipment is not to hand. It is also known that in general, the quicker a stain is treated, such as a spot stain, the better the chance of successful removal. Moreover, it is often most convenient to deal with a spot stain as soon as it occurs such that one can perhaps avoid the need of washing the textile at all using conventional processes, or the spot stain can be removed or at least partially removed, such that effect of any unsightly stain is reduced to a level that allows the reduced stain to be tolerated, perhaps until conventional washing processes, or dry cleaning processes, can be employed.

Therefore, there is the need to provide convenient stain removing or partially removing (i.e. stain reducing) patches which seek to alleviate the above-mentioned drawbacks of conventional washing processes, and/or provide convenient methods of stain removal/reduction, such as stain removal/reduction without the need for a full conventional washing process. Moreover, there is the need to provide stain removing/reducing patches which improve the effectiveness of the conventional washing or dry cleaning processes.

WO-A-02/102957 (to Reckitt Benckiser (UK) Limited) discloses textile treatment compositions comprising a patch with a water impervious backing made of a polymer sheet to which is attached a hydrogel containing a surfactant treatment fluid.

Nevertheless, there remains the need for alternative and/or improved methods for the treatment of surfaces, particularly textile surfaces, for the removal/reduction

of stains, both in terms of user convenience and stain removal/reduction ability, and for alternative and/or improved surface, particularly textile surface, treatment compositions.

Therefore, in a first aspect, the present invention provides a method for the treatment of a surface, particularly the treatment of a soft surface, such as for example a textile, comprising the steps of the separate application to said surface of at least two components to form a removable patch on said surface, and the removal of the patch once the said removable patch has formed or substantially formed thereon.

Preferably, in the method of the invention, the at least two components are kept separate from each other substantially until they are applied to the surface.

Preferably the components are applied sequentially to the surface.

Preferably, by "sequentially", we mean that the second (and further, if present) component is applied to said surface after the first (or previous) component has been applied, more preferably with a time gap between such applications, as described hereinafter.

Preferably, the method of treatment is a cleaning method, more preferably stain removal or reduction.

By "removable patch" we mean a patch that has sufficient solid or gel-like characteristics that it is peelable or otherwise substantially removable by the user without the

user requiring any specialist techniques or aids, or which is removed by conventional washing or dry cleaning processes after becoming solid or substantially solid or gel-like.

By "surface", we denote, preferably, inanimate surfaces, including non-dermal surfaces. We include both hard and soft surfaces. By "hard surface", we include ceramics, glass, stone, plastics, marble, metal and/or wood surfaces, such as, in the household environment for example, bathroom and kitchen hard surfaces such as sinks, bowls, toilets, panels, tiles, worktops, dishes, and the like.

By "soft surface", we include textiles, clothing, carpets, curtains, upholstery, textile or fabric covered articles, and the like.

Thus, there is preferably provided a convenient method of spot stain removal/reduction, which is convenient, practical, can be performed *in situ* (i.e. by the user immediately after the stain is noted), available wherever the user is situated, and employable without necessarily requiring conventional washing means, or a method which improves the effectiveness of the eventual washing process. In essence, the user is in control of the formation of the patch and can thus conveniently apply removable-patch forming components at his convenience. A yet further advantage is that the user is able to visibly see the stain passing into the removable patch as it forms and once removed, the patch may show some colouration from the stain, confirming to the user the effectiveness of the method. A still yet further advantage of the present

invention is that the user can control the onset of patch formation by the timing of the sequential addition of the components. A yet further advantage is that no pre-mixing of the components is required.

Preferably, the method is such that it can conveniently be carried out in circumstances where there is no availability of conventional washing processes, or where such conventional processes would be inconvenient, for instance where the user wishes to treat a spot stain immediately, for instance as and when staining occurs. In such cases, it may not be necessary to clean the whole surface and the present method enables just the area of the surface stained to be treated.

Moreover, although the removal of the removable patch is generally performed manually by the user, for example by peeling, it is also possible for the removable patch, once formed, to be removed as part of the conventional washing or dry cleaning process, such as in a textile washing machine. In such cases, the removable patch comprises a water-soluble or dispersible polymer which dissolves or disperses into a wash liquor. Thus, one benefit of the method of the invention is that it is possible for the user to control the formation of the removable patch as soon as possible after the staining has occurred and the conventional washing/dry cleaning process can then be carried out at a convenient time thereafter. Conventional wash pre-treatments essentially require the washing/dry cleaning process to follow almost immediately after application of the pre-treatment formulation, i.e. whilst the pre-treatment is still wet. Hence, the present method enables the treating effect of the removable patch to be

started as soon as practical after staining, with the washing/dry cleaning process following at a convenient time thereafter.

Preferably, the at least two components are liquid components.

Suitably, the method of the invention enables the user to more precisely determine the onset of the formation of the patch, by the sequential addition of the two components, particularly as the two components are preferably such that patch formation requires the presence of both or the at least two components. As such, the user can either speed up the onset of patch formation by adding the at least two components in fairly quick succession, and thus quicken the overall treatment method, or the user can delay the onset of the patch formation by leaving a longer time delay before adding the second component, and thus slow down the overall treatment method, giving further time for the still liquid first component to penetrate into the textile. As the removal/reduction of a stain will be enhanced by at least part of the stain passing into the liquid components and then being "locked" into the patch as it forms, delaying the onset of patch formation can be advantageous.

In a preferred embodiment, one component, preferably liquid component, to be added comprises metal cations, preferably $M^{2+}$ ions (where M is a Group IIA element or any other metallic element capable of exhibiting a +2 oxidation state), more preferably wherein M is a Group IIA element, even more preferably $Ca^{2+}$ ions, i.e. this liquid component comprises an $M^{2+}$ salt, e.g. a calcium salt,

preferably the hydrate of an $M^{2+}$ salt, a calcium salt. Yet more preferably, this liquid component comprises $Ca^{2+}$ ions in the form of calcium chloride, for example as calcium chloride dihydrate, $CaCl_2.2H_2O$.

Without wishing to be bound by theory, it is believed that the metal cations cross-link the polymeric material of the other component as part of the patch-forming process. Therefore, a requirement for this component is that it comprises a species capable of cross-linking the polymer material of the other component as part of the patch-forming process.

Moreover, in a preferred embodiment, one component, preferably liquid component, to be added comprises a hydrogel. By the term "hydrogel" as used herein it is meant a natural or synthetic polymeric material which possesses the ability to swell in water. The hydrogel may be water-insoluble or water-soluble. Generally, synthetic hydrogels are formed by polymerizing a hydrophilic monomer in an aqueous solution under conditions where the polymer becomes cross-linked so as to form a three dimensional polymer network. Natural hydrogels are also included, such as alginates and polysaccharides, such as chitosan, xanthan and locust bean gum.

Preferably, the hydrogel is a hydrophilic homopolymer or copolymer of acrylic or methacrylic acid, a salt or ester thereof; a homopolymer or copolymer or acrylamide or acrylonitrile, cellulose ether, carboxylated cellulose derivative, polyalkylene oxide or polyurethane. The polymer is cross-linked to a relatively low degree and but for the cross-linking would be essentially water-soluble.

The polymer may include in its structure a polysaccharide such as starch, for example in a graft copolymer.

More preferably, the hydrogel-containing or hydrogel-comprising component to be added comprises alginic acid or an alginate, where an alginate is a salt of alginic acid, even more preferably, a sodium alginate. Hereinafter, the term "alginate" is used to refer to either alginic acid or a salt thereof, such as a sodium salt.

Alginic acid or alginates may be found in and isolated from various organisms, in particular from algae belonging to the order Phaeophyceae and soil bacteria such as Azotobacter vinelandii and Azotobacter crococcum and from several strains of Pseudomonas bacteria. Common algal sources of algins include Laminaria digitata, Ecklonia maxima, Macrocystis pyrifera, Lessonia nigrescens, Ascophyllum nodosum, Laminaria japonica, Durvillea antartica, Durvillea potatorum and, especially, Laminaria hyperborea.

Alginic acid is a linear hetero-polysaccharide comprising units of β-D-mannuronic acid and α-L-guluronic acid. Alginic acid may comprise homopolymeric sequences of mannuronic acid, homopolymeric sequences of guluronic acid, and mixed sequences of mannuronic acid and guluronic acid units.

Salts of alginic acid used in the method of the present invention may include alkali metal salts, for example sodium and potassium salts, and ammonium and alkanolamine salts. Alkali metal salts are of particular interest.

The terms "algins" or "alginates" as used herein include alginic acid and salts of alginic acid, irrespective of the relative proportion of mannuronic and guluronic units, and is intended to include glycolated or alkoxylated derivatives, especially those derivatised with propylene glycol. However, preferred compounds are not alkoxylated or glycolated. Guluronic acid-rich alginic acid and guluronic acid-rich salts of alginic acid are of particular interest. Preferred compounds have at least 50%, more preferably 55-99%, most preferably 60-80% of guluronic units (by weight), the balance being mannuronic units. For guidance on production of algins very high in guluronic units the reader is referred to WO 98/51710.

In a preferred embodiment of the method of the invention, the first liquid component to be added in the sequential addition of at least two liquid components to the surface comprises $CaCl_2.2H_2O$, the second liquid component to be added comprising an alginate, preferably a sodium alginate.

Nevertheless, in a further embodiment of the method of the invention, the first liquid component to be added in the sequential addition of at least two liquid components to the surface comprises an alginate, preferably a sodium alginate, the second liquid component to be added comprising $CaCl_2.2H_2O$. In other words, the components can be added in either order.

In the above-mentioned embodiments, the method of the invention results in the formation of a gel-like patch which, after a suitable time period, can be removed by the

user from the surface to which the components have been sequentially applied. Clearly, the easier the patch is to remove from the surface, the more user-friendly and effective will be the method of the invention. It has been found that sequential addition of a third component, i.e. a treatment method comprising the steps of the sequential addition of three liquid components to form a removable patch, and the removal of the patch once the said removable patch has formed or substantially formed, is preferred when the third component acts as a hardener or setting agent and as such, decreases the time for the patch to form or to substantially form. In this preferred embodiment, the first liquid component, preferably comprising $Ca^{2+}$ ions, more preferably comprising $CaCl_2.2H_2O$, is also found to be a preferred third component. Hence, in this preferred embodiment, the sequential addition of components is as follows: first component, component comprising $M^{2+}$ ions as hereinbefore defined; second component, component comprising a polymeric material such as a hydrogel as hereinbefore defined; third component as first component (as hereinbefore defined).

Even more preferably, the first component comprises $CaCl_2.2H_2O$, the second component comprises an alginate, preferably a sodium alginate, the third component comprises $CaCl_2.2H_2O$.

However, although a decrease in the time taken to form or substantially form the removable patch can in some instances be preferred, particularly from the point of view of convenience and hence user-compliance, in other instances where the stain removal is taking place whilst

the patch forms, an increase in the time taken for the patch to form can be an advantage. In effect, there is a balance between the shorter times preferred for user-friendliness and convenience, and the slightly longer times preferred to enable more of the stain to be taken out of the surface (by wicking, capillary action, or diffusion into the components, as the removable patch forms from the liquid components). Preferably, a removable patch is formed or substantially formed between 30 secs and 15 mins after the final component is applied, more preferably between 45 secs and 12 mins after the final component is applied, most preferably between 1 min and 10 mins after the final component is applied.

Preferably, the component or components comprising metal cations, preferably $M^{2+}$ ions, more preferably comprising $Ca^{2+}$ ions, even more preferably $Ca^{2+}$ ions in the form of calcium chloride dihydrate, comprises sufficient metal cations, preferably $M^{2+}$ ions, such that the amount of metal cations, preferably $M^{2+}$ ions, in this component or components is in the range 2 to 50 wt% compared to the weight of polymeric material, for example hydrogel, preferably alginate, in the component comprising hydrogel/alginate. More preferably, the amount of metal cations, preferably $M^{2+}$ ions, is in the range 8 to 36 wt%, yet more preferably 10 to 30 wt%, even more preferably in the range 12 to 28 wt%, most preferably in the range 15 to 25 wt%, of the weight of hydrogel/alginate. In general, it is found that if the amount of metal cations, preferably $M^{2+}$ ions, is significantly below 2% by weight, then the gelling characteristics begin to deteriorate; similarly, if the amount of metal cations, preferably $M^{2+}$ ions is significantly above 50% by weight, the component

tends to shrink when applied to the surface and this impairs overall performance of the patch. Preferably, this component comprises metal cation containing ingredients in the range 0.1 to 10 wt% of the overall weight of this component, more preferably in the range 0.5 to 3.5 wt%, even more preferably in the range 0.5 to 3.0 wt%, most preferably in the range 0.8 to 2 wt%.

Preferably, the component comprising a polymeric material such as a hydrogel, more preferably comprising an alginate, comprises hydrogel in the range 0.1 to 10 wt% compared to the overall weight of that component, more preferably in the range 0.25 to 5 wt%, most preferably 0.4 to 4 wt%, for example 0.5 wt% or 3 wt%. More preferably, when alginate is used, the alginate should have a G-block ratio of at least 15%, even more preferably at least 25%, most preferably at least 35%, as this is found to increase the integrity of the patch thus formed and hence the ease with which the removable patch thus formed can be removed. By G-block ratio, we mean the ratio of guluronic units to mannuronic units in the alginate (by weight), and more preferably the alginates have at least 50%, even more preferably 55-99%, most preferably 60-80% of guluronic units (by weight), the balance being mannuronic units.

Without wishing to be bound by theory, alginates are, as noted hereinbefore, comprised of mannuronate and guluronate monomers and in order to form a gel, and thus a usable patch in the method of the present invention, the alginate should contain a sufficient level of guluronate monomers in a block to react with the metal cations, such as divalent ions, from the other component(s) to form a gel. It is believed that the divalent ions especially,

essentially "fit" into the guluronate block structure in suitable alginates.

Suitable alginates for use in the method of the present invention include those in the Protanal™ range, LF20™, GP6650™, and XP3499™ (all available from FMC BioPolymer of Philadelphia, PA 19103, USA). Protanal™ LF20™ is preferred and is a sodium alginate available from FMC BioPolymer. A 1 wt% aqueous solution thereof at ambient temperature has a viscosity of 155 to 255 mPa.s and a pH of 6.0 to 8.0.

Preferably, all components used in the method of the present invention are liquid solutions, more preferably aqueous solutions (i.e. free-flowing aqueous solutions), most preferably the components are non-emulsions.

In further embodiments of the invention further agents can be in one, more, or all of the components of the method of the invention, as described below, which may improve still further the treatment ability of the method of the invention. In preferred embodiments the preferred further agents are cleaning agents; that is agents which in some manner promote or improve the cleaning performance of the patch.

For the avoidance of doubt, any one or more of the agents set out below can be added to the components as set out hereinafter, in any mutually compatible manner.

Hence, a yet further advantage of the method of the present invention is that because the at least two components are kept separate as and until the user wishes

to form the patch, it is possible for mutually incompatible or antagonistic further ingredients or agents to also be effectively kept apart, as and until the removable patch is to be formed.

Anti-Limescale Agents

Examples of anti-limescale agents include acids, particularly organic acids (e.g. citric acid), and anti-nucleating polymers, such as polyacrylates. Other relevant acids that may be present include glycolic and sulphamic acids. Preferably, the amount of acid present for limescale removal is sufficient to provide an overall pH of the patch of 1-7, more preferably 2-7, most preferably 3-6.

Bleaches

Peroxygen bleaching agents are preferred. Suitable peroxygen bleaching compounds include sodium carbonate peroxyhydrate and equivalent "percarbonate" bleaches, sodium pyrophosphate peroxyhydrate, urea peroxyhydrate, and sodium peroxide. Persulfate bleach (e.g. OXONE, manufactured commercially by DuPont) can also be used.

Bleach activators can also be present. Bleach activators lead to the in situ production in aqueous solution of the peroxy acid corresponding to the bleach activator. Various nonlimiting examples of activators are disclosed in US Patent 4,915,854, issued April 10, 1990 to Mao et al, and US Patent 4,412,934. The nonanoyloxybenzene sulfonate (NOBS) and tetraacetylethylene diamine (TAED) activators are typical and are preferred, and mixtures

thereof can also be used. See also US 4,634,551 for other typical bleaches and activators useful herein.

Preferably, bleach if present, is in the component comprising metal cations, preferably $M^{2+}$ ions, i.e. the non-hydrogel containing component (this term is simply used to distinguish from the hydrogel-containing component term), as defined herein, at a level in the range 0 to 8 wt%, more preferably 2 to 7 wt%, most preferably in the range 4 to 6 wt%, of the component.

Enzymes

Enzymes can be included in the components herein for a wide variety of fabric laundering purposes, including removal of protein-based, carbohydrate-based, or triglyceride-based stains, for example, and for the prevention of dye transfer, and for fabric restoration. The enzymes to be incorporated include proteases, amylases, lipases, cellulases, and peroxidases, as well as mixtures thereof. Other types of enzymes may also be included. They may be of any suitable origin, such as vegetable, animal, bacterial, fungal and yeast origin. However, their choice is governed by several factors such as pH-activity and/or stability optima, thermostability, stability versus active detergents, builders and so on. In this respect bacterial or fungal enzymes are preferred, such as bacterial amylases and proteases, and fungal cellulases.

Preferably, enzymes if present, are in any component, at a level in the range 0.001 to 5 wt%, more preferably 0.01 to 1 wt%, of the component.

Solvents

Solvents, particularly organic solvents, may be present in any of the components. More preferably, organic solvents, such as glycol ethers, $C_1$-$C_{10}$ alcohols, $C_1$-$C_{10}$ hydrocarbons or halohydrocarbons, carbonyl-based solvents such as acetone, and the like, are present, preferably in the component(s) comprising $M^{2+}$ ions. The organic solvent, if present, should preferably be included in an amount from 5 to 50 wt% of the component. The overall levels of organic solvents should be within the VOC limits of cleaning products and preferably, the maximum level of organic solvent in each component is 8 wt%, more preferably, up to 6 wt%, most preferably up to 4 wt%.

Surfactants

Non-limiting examples of surfactants useful herein comprise an anionic such as sulfonates, sulphates and ether sulphates or/and a nonionic such as an ethoxy or propoxylated alkyl, fatty acid or alcohol. These include the conventional C11-C18 alkyl benzene sulfonates ("LAS") and primary, branched-chain and random C10-C20 alkyl sulfates ("AS"), the C10-C18 secondary (2,3) alkyl sulfates of the formula $CH_3(CH_2)_x(CHOSO_3\text{-}M^+)CH_3$ and $CH_3(CH_2)_y(CHOSO_3\text{-}M^+)CH_2CH_3$ where x and (y + 1) are integers of at least about 7, preferably at least about 9, and M is a water-solubilising cation, especially sodium, unsaturated sulfates such as oleyl sulfate, the C10-C18 alkyl alkoxy sulfates ("AExS"; especially EO 1-7 ethoxy sulfates). C10-C18 alkyl alkoxy carboxylates (especially the $EO_{1-5}$ ethoxycarboxylates), the C10-18 glycerol ethers,

the C10-C18 alkylpolyglycosides and their corresponding sulfated polyglycosides, and C12-C18 alpha-sulfonated fatty acid esters. If desired, the conventional nonionic and amphoteric surfactants such as the C12-C18 alkyl ethyoxylates ("AE") including the so-called narrow peaked alkyl ethoxylates and C6-C12 alkyl phenol alkoxylates (especially ethyoxylates and mixed ethoxy/propoxy), C12-C18 betaines and sulfobetaines ("sultaines"), C10-C18 amine oxides, and the like, can also be included in the overall compositions. The C10-C18 N-alkyl polyhydroxy fatty acid amides can also be used. Typical examples include the C12-C18 N-methylglucamides. See WO 92/06154. Other sugar-derived surfactants include the N-alkoxy polyhydroxy fatty acid amides, such as C10-C18 N-(3-methoxypropyl) glucamide. Mixtures of anionic and nonionic surfactants are especially useful. Other conventional useful anionic, amphoteric, nonionic or cationic surfactants are listed in standard texts.

Most preferably, the surfactant is sodium lauroyl sarcosinate, available in 30% form as SURFAC SL30F™ (from Surfachem Plc, Leeds LS1 4LT, UK).

Preferably, surfactant(s) if present, is/are in the hydrogel-containing component(s), at a level in the range 0.01 to 50 wt%, more preferably 0.05 to 20 wt%, most preferably 0.1 to 10 wt%, for example 4 wt%, of the component.

Preferably, at least one of the components used in the method of the invention further includes one or more of the following: a bleach (with or without a bleach activator), an enzyme or enzyme system (including any

necessary stabilisers) and at least one surfactant, more preferably at least one surfactant. In this particular embodiment, i.e. when the method is essentially an enhanced cleaning method (due to the presence of the bleach/enzyme/surfactant agent(s)), any or all of the components may further comprise fragrances. Preferred fragrances which can be included in the components herein include but are not limited to those selected from the group consisting of aromatic and aliphatic esters, for example those esters having molecular weights of from 100 to 300, preferably 130 to 250; aliphatic and aromatic alcohols, for example those having molecular weights of from 75 to 250, preferably 90 to 240; aliphatic ketones, for example those having molecular weights of from 100 to 300, preferably 150 to 260; aromatic ketones, for example those having molecular weights of from 100 to 300, preferably 150 to 270; aromatic and aliphatic lactones, for example those having molecular weights of from 100 to 350, preferably 130 to 290; aliphatic aldehydes, for example those having molecular weights of from 100 to 250, preferably 140 to 200; aromatic aldehydes, for example those having molecular weights from 50 to 250, preferably 90 to 230; aliphatic and aromatic ethers, for example those having molecular weights of from 100 to 300, preferably 150 to 270; and condensation products of aldehydes and amines, for example those having molecular weights of from 100 to 400, preferably 180 to 320.

More preferably, at least one of the components used in the method of the present invention comprises at least one surfactant.

Sequestrants

Sequestrants, such as Dequest 2066™ (available from Solutia Inc., St. Louis 6366-6760, USA), EDTA, and Dissolvine EDG™ (available from Akzo Nobel, Gillingham, ME7 1RL, UK), aid in stain removal and hence are preferably present in one or more of the components of the method of the present invention, more preferably in the hydrogel-containing component.

The overall level of sequestrant present should be within permitted phosphorus regulations, if relevant. Hence, the upper limit to be used is specific to the particular sequestrant. Thus, for Dequest™ 2066, the amount present is preferably up to 1.5 wt%, more preferably up to 1 wt%, most preferably up to 0.8 wt%, for example 0.8 wt% of the component. Where permitted phosphorus regulations are not relevant, the sequestrant may be present up to 20 wt%, more preferably 15 wt%, of the component. Preferably, the sequestrant is present in any hydrogel-containing components.

The components of the invention are made up to 100 wt% by water, preferably de-ionised water, and preferably at levels of 5 to 99 wt% water.

Any or all of the components may further comprise additional cleaning agents, such as monoethanolamine and triethanolamine, at levels in the range 5-20 wt%, more preferably 5-15 wt%, most preferably 5 to 10 wt%, of the respective component.

Any or all of the components may further comprise additional ingredients, such as particulate adsorbents, preferably 1 to 10% of the respective component, based on the composition, antimicrobials (e.g. quaternary ammonium compounds, triclosan, and other phenolic agents such as para-chloro meta xylenol (PCMX), citric acid, lactic acid) and if present, are preferably present in the range of 0.01 to 5 wt% of the component, more preferably in the range 0.02 to 3 wt%, e.g. at 1 wt% (especially for triclosan); preservatives, e.g. methylparaben, ethylparaben, propylparaben, or mixtures thereof (if present, preferably present in the range of 0.01 to 0.5 wt% of the component, more preferably in the range 0.01 to 0.2 wt%); or film formers such as polyvinyl alcohol (preferably present in the range of 0-50 wt% of the component where present), polyvinyl alcohol/vinyl acetate copolymers (preferably present in the range of 0-50 wt% of the component where present), and polyvinylpyrrolidone/vinyl acetate copolymers (preferably present in the range of 0-50 wt% of the component where present).

A dye can be added to any component to make a coloured patch.

A fragrance can be added to any component to make a scented patch. Preferably a fragrance, when used, is in either component at a level in the range of 0.1 to 5 wt%, more preferably 0.2 to 4 wt%, most preferably 0.5 to 3 wt%, of the weight of the component.

Glycerol may be used to improve the integrity and hence the peelability and thus removability of the patch formed

using the method of the present invention, particularly when the glycerol is in the hydrogel-containing component.

Thus, although glycerol is an optional presence in any hydrogel-containing components of the method of the present invention at between 0 and 50 wt%, when present it is preferably found at 2 to 25 wt%, more preferably 4 to 20 wt%, most preferably 6 to 15 wt%, of that component.

An example of particularly preferred components for use in the method of the present invention includes the following:

Hydrogel-Containing Component

| Ingredient | Preferred wt% range | Most preferred wt% |
|---|---|---|
| Alginate (e.g. sodium alginate, Protanal™LF20™) | 0.5-4 | 3 |
| Sodium lauroyl sarcosinate (30%) | 1-6 | 4 |
| Dequest 2066™ sequestrant | 0.2-0.8 | 0.75 |
| Glycerol | 6-15 | 8 |
| Balance D.I. water | | |

$Ca^{2+}$-Containing Component

| Ingredient | Preferred wt% range | Most preferred wt% |
|---|---|---|
| $CaCl_2.2H_2O$ | 0.5-3.5 | 1.1 |

Balance D.I. water

The wt% values given in the tables above are given as percentages of the weight of the respective components.

The respective components are formed simply by thorough mixing of the respective ingredients at room temperature and ambient pressures. In the case of the component comprising hydrogel, it is preferred to first disperse the hydrogel (alginate) in the glycerol, then add the water, then the surfactant and sequestrant.

Preferably, in the method of the present invention the user applies a first component to cover all or substantially all of the stain, and then, preferably within 120 seconds, more preferably within 90 seconds, even more preferably within 60 seconds, most preferably within 30 seconds, e.g. as soon as reasonably practical thereafter, applies a second component to cover all or substantially all of the first component, wherein these components are the components described hereinbefore, i.e. preferably a component comprising a hydrogel and a component comprising $M^{2+}$ ions. Where a third component is to be added, this is applied to cover all or substantially

all of the second component, within similar time periods to those noted above, with the overall application of all components being preferably within 180 secs, more preferably within 120 secs, most preferably within 90 secs.

The components are then left until a removable patch has formed or substantially formed, which can then be removed by the user. Typically the patch takes between 10 secs and 10 mins after application of the final component, and may in certain embodiments, particularly when surfactant is present, be indicated by the formation of a white colour as the patch forms or substantially forms. Thus, preferably, the patch is removed at least 10 secs after application of the final component, more preferably at least 1 min after application of the final component, even more preferably at least 2 mins after application of the final component, yet even more preferably at least 5 mins after application of the final component, most preferably at least 10 mins after application of the final component.

The method of the present aspect of the invention may remove or substantially remove many if not all common stains found on textiles and the like, e.g. oxidisable, such as coffee, tea and wine stains, proteinaceous stains, together with 'greasy' stains such as those produced by lipstick and the like, grass stains etc.

Additional, and optional, method steps include the following:

i) applying force to the patch as it is forming;
ii) removing said force once applied;

iii) rubbing the patch as it is forming;

iv) immersing the surface into a wash liquid.

However, the nature of the patch formed by the method of the invention is such that all of the above steps are optional. Therefore a yet further advantage of the method is its simplicity and hence the increased likelihood of user compliance and thus effective treatment of the surface.

According to a second aspect of the present invention there is provided a removable patch comprising a hydrogel-containing component, and a non-hydrogel containing component, both as described hereinbefore.

According to a third aspect of the present invention there is provided a removable patch comprising a hydrogel-containing component, and a non-hydrogel containing component, both as described hereinbefore, and wherein said patch is obtainable by the method described hereinbefore.

According to a fourth aspect of the present invention there is provided the use of a removable patch comprising a hydrogel-containing component, and a non-hydrogel containing component, both as described hereinbefore, in the treatment of a surface, preferably by the sequential application of said components to said surface.

According to a fifth aspect of the present invention there is provided the use of a removable patch comprising a hydrogel-containing component, and a non-hydrogel containing component, both as described hereinbefore, in

the removal of a stain, or part of a stain, from a surface, or a reduction in the amount of said stain, preferably by the sequential application of said components to said surface.

According to a sixth aspect of the present invention there is provided a kit comprising a hydrogel-containing component, and a non-hydrogel containing component, both as described hereinbefore.

According to a seventh aspect of the present invention there is provided an applicator means comprising a plurality of separate compartments and wherein each compartment contains at least either a hydrogel-containing component, and a non-hydrogel containing component, both as hereinbefore described, such that said components are kept apart, or substantially kept apart, as and until the components are sequentially applied to a surface to form a removable patch.

According to an eighth aspect of the present invention there is provided a method for the treatment of a surface, particularly the treatment of a soft surface, such as for example a textile, comprising the steps of the sequential application to said surface of at least two components as hereinbefore described to form a removable patch on said surface.

According to a ninth aspect of the present invention there is provided a method for the treatment of a surface, particularly the treatment of a soft surface, such as for example a textile, comprising the steps of the sequential

application to said surface of at least two components as hereinbefore described to form a patch on said surface.

Finally, according to a tenth aspect of the present invention there is provided the use of a kit comprising a hydrogel-containing component, and a non-hydrogel containing component, both as described hereinbefore, in the treatment of a surface, preferably the removal of a stain, or part of a stain, from a surface, or a reduction in the amount of said stain, preferably by the sequential application of said components to said surface.

In the wording of these second to tenth aspects of the invention, we use "non-hydrogel containing component" simply to distinguish it from "hydrogel-containing component" and the former refers to the component which forms a removable patch with the hydrogel-containing component, i.e. that preferably comprising $M^{2+}$ ions, or a species providing $M^{2+}$ ions, e.g. calcium chloride.

By "compartments", we simply mean a region or container where the particular component is kept until use.

For the avoidance of any doubt, each and every feature described hereinbefore in relation to the first aspect of the present invention is equally applicable to any or all of the other aspects of the present invention, unless such features are incompatible with the particular aspect or mutually exclusive.

The sequential application of the components to the surface can be carried out by any convenient means, for example, by roll-on, spraying (e.g. from an aerosol or

pump dispenser), brushing, painting, pouring, rubbing, squeezing etc., but sequential application by spraying or squeezing from a compartment is preferred. Examples of suitable applicator means include any multi-compartment device wherein the components are kept separate from each other as and until application by the user is desired. As such, the separator means can be any substantially non-porous structure. Applicator means should preferably be user-friendly and easily-portable, such as multi-compartment blister packs (with each component in a separate blister), or multi-headed or nibbed applicators (wherein each component is within a separate compartment within the body of the applicator). Moreover, the dispensing element is preferably designed to match the preferred mode of application for the particular component, i.e. brush-type application, spray nozzle, nib-like, roll-on applicator etc.

When the applicator means is to sequentially apply two components, the applicator comprises two separate compartments. However, when the applicator means is to sequentially apply more than two components, either an equivalent number of separate compartments can be provided or, alternatively, an equivalent number of separate compartments can be provided equal to the number of different components.

Preferably, the compartments of the applicator contain pre-measured amounts of component to ensure application of the preferred amounts of components. Moreover, compartments may be numbered, or otherwise labelled, to ensure the correct order of sequential application of components.

All publications mentioned herein are incorporated by reference thereto.

The present invention will now be further illustrated by means of the following non-limiting Examples.

Example 1

Stain Removal Tests

Pre-stained cotton swatches were obtained from Wfk-Cleaning Technology Research Institute, Krefeld, Germany. The swatches were pre-stained with either coffee or red wine.

A hydrogel-containing component (component 2) was formed by dispersing Protanal™LF20™ alginate (3 wt%) in glycerol (8 wt%). De-ionized water was then added (in an amount to ensure the wt% figures given herein for the component), followed by sodium lauroyl sarcosinate (4 wt%), and Dequest 2066™ sequestrant (0.75 wt%). This was all performed at room temperature and atmospheric pressure. A non-hydrogel-containing component (component 1) was formed by mixing $CaCl_2.2H_2O$ (1.1 wt%) in de-ionized water at room temperature and atmospheric pressure.

All wt% figures given above are based on the total weight of the particular component.

The components were then applied to the pre-stained swatches in the following sequence: component 1, followed by component 2, followed by component 1. Component 1 was applied via spraying; component 2 was applied by squeezing

from a tube or bottle. Approximately 20 secs was left between the application of each component before the next was added. The patch was then left for 10 mins, after which time the presence of the sodium lauroyl sarcosinate surfactant ensured that the patch that had formed appeared a white colour. The patch was then removed manually by peeling.

Table 1 below shows the results of the stain-removal tests, with the removal score being on a scale of 0-10, where 0 represents no visible removal of stain and 10 represents complete removal of stain.

Table 1

| Stain on swatch | Removal Score |
|---|---|
| Coffee | 7 |
| Red Wine | 6 |

Moreover, no unpleasant odour was emitted during the test from the patch, swatch or stain, and the swatch remained colour-fast even after patch removal.

Clearly, the method of the present invention was successful in removing/reducing a selection of common stains.

By way of comparison, addition of component 2 alone, i.e. without component 1, led to no patch formation, nor any stain removal. Similar results were found by adding only component 1 to the stain. Further comparative studies where the wt% of metal cation in component 1 was less than 0.1, and others where this wt% was above 10%, also gave poor results. Indeed, when the wt% of metal cation

compared to the wt% of alginate was below 2 wt%, or above 50 wt%, poor results were obtained in both patch formation and stain removal.

CLAIMS

1. A method of cleaning a surface, the method comprising the steps of separately applying to said surface at least two components to form a removable patch on said surface, and the removal of the patch once the said removable patch has formed or substantially formed thereon.

2. A method as claimed in claim 1 wherein said surface is an inanimate surface.

3. A method as claimed in claim 1 wherein said surface is a soft surface, for example a surface selected from the list consisting of textiles, clothing, carpets, curtains, and upholstery.

4. A method as claimed in claim 1 wherein said surface is a hard surface.

5. A method as claimed in any preceding claim wherein said removal is achieved by peeling said patch from said surface.

6. A method as claimed in any of claims 1 to 3 wherein said removal is via a washing process.

7. A method as claimed in any preceding claim wherein the two components are applied sequentially.

8. A method as claimed in claim 7 wherein the second of the at least two components is applied within 120 seconds of the application of the first component.

9. A method as claimed in any preceding claim wherein two components are sequentially applied and one component comprises $M^{2+}$ ions (where M is a Group IIA element or any other metallic element capable of exhibiting a +2 oxidation state) and the other component comprises a hydrogel.

10. A method as claimed in claim 9 wherein said $M^{2+}$ ions are $Ca^{2+}$ ions.

11. A method as claimed in either of claims 9 and 10 wherein said hydrogel is an alginate.

12. A method as claimed in claim 11 where said alginate is a sodium alginate.

13. A method as claimed in any of claims 9 to 12 wherein said $M^{2+}$ ions are present in the range 10 to 30 wt% of the weight of hydrogel.

14. A method as claimed in any of claims 9 to 13 wherein said $M^{2+}$ ions are present in the range 0.5 to 3 wt% of the weight of the component containing said ions.

15. A method as claimed in any of claims 9 to 14 wherein said hydrogel is present in the range 0.25 to 5 wt% of the weight of the component containing said hydrogel.

16. A method as claimed in any preceding claim further comprising the sequential addition of a third component and wherein said third component comprises $M^{2+}$ ions.

17. A method as claimed in any preceding claim wherein at least one of said components further comprise one or more of the following: a bleach (with or without a bleach activator), an enzyme or enzyme system (including any necessary stabilisers) and at least one surfactant.

18. A method as claimed in any preceding claim wherein at least one of said components comprises at least one surfactant.

19. A method as claimed in any preceding claim wherein said component comprising hydrogel comprises the following: 0.5-4 wt% alginate, 1-6 wt% surfactant, 0.2-0.8 wt% sequestrant, 6-15 wt% glycerol, balance water.

20. A method as claimed in any preceding claim wherein said component comprising $M^{2+}$ ions comprises the following: 0.5-3.5 wt% $CaCl_2.2H_2O$, balance water.

21. A removable cleaning patch comprising at least two components which on deposition separately on a surface form a removable cleaning patch thereon.

22. A removable patch as claimed in claim 21, wherein the components of the patch are as defined in any of claims 9 to 20.

23. A removable patch as claimed in claim 21 or 22, wherein the patch is obtainable by the method of any of claims 1 to 8.

24. Use of a removable patch as claimed in any of claims 21 to 23, in the removal of a stain from a surface.

25. Use as claimed in claim 24 wherein said patch is formed by the sequential application of said components to said surface.

26. A cleaning kit comprising separate components which form a removable cleaning patch when deposited separately on a surface, the kit containing instructions for the separate deposition of the components.

27. An applicator means comprising at least two separate compartments, wherein each compartment contains a respective component, wherein said components are such that on deposition separately on a surface they together form a removable cleaning patch thereon.

28. A cleaning method, removable cleaning patch, use, kit or applicator substantially as described herein.

## ABSTRACT

## METHOD AND APPARATUS

The present invention provides a method for cleaning stains from a surface. The method comprises the steps of the separate application to said surface of at least two components to form a removable cleaning patch on said surface, and the removal of the patch. Also provided are the use of said removable patches, a kit comprising said components, and applicator means comprising a plurality of separate compartments suitable for use in the method of the invention.